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BIENNIAL REPORT  
OF THE  
BOARD OF HEALTH  
OF THE  
STATE OF DELAWARE,  
JANUARY, 1883.

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# REPORT.

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*To His Excellency,*

*JOHN W. HALL,*

*Governor of Delaware.*

The second biennial report of the Board of Health of the State of Delaware is herewith submitted to your Excellency, in the hope that, if any part thereof or in its entirety it should meet your approval, you will urge upon the Legislature the necessity of taking action upon the vital questions presented, and ask of them increased means for the furtherance of their special functions as sanitarians. Indeed the whole people unitedly and determinedly must unite with the professional sanitarian in any effective movement improving the public health. By himself, the hygienist is almost powerless. In presenting the same, we desire to congratulate you, and the citizens of the State, upon the general healthfulness which has characterized the State during the period which has intervened since our last report, in December, 1880. With the exception of Small-Pox in the City of Wilmington, which at one time threatened to become an epidemic, and a number of cases of Diphtheria and Typhoid Fever in various localities of our State, no disease or diseases of a virulent character have generally prevailed; indeed, the events of the past two years, in regard to the average condition of the public health throughout the State, have varied but little from the ordinary incidents of previous years; the most noteworthy feature being the prevalence of Small-Pox in the City of Wilmington, which at one time threatened to become an epidemic. From Registrar Frazer's report of the City of Wilmington, on vital statistics, which furnishes tables of the births, marriages, and deaths for the year ending December, 1881, we learn how carefully and elaborately he has worked them out. These statistics are classified and tabulated in condensed form, and, in addition, tables and summaries are given with comparative results for six years past, with comments. The Secretary of the Board of Health for the

State has not been so fortunate, however, in presenting his report on vital statistics for the whole State, by reason of the fact that so many physicians and midwives in the two lower counties have failed to make their returns to the Recorders promptly. The positive value of vital statistics must depend upon the fullness and accuracy of the registration returns by the physicians of the entire State, and we hope for increased promptitude in the future. Vital statistics is of such importance that registration of marriages, births and deaths, and the causes of the latter, demand the attention of the legislator, as it is the basis of all sanitary work. Without a knowledge of the death-rate of different localities, and the diseases which produced it, we are unable to investigate the sanitary relations which one part of the State bears to the other; we should learn the casual or local relations associated therewith; we should know where disease prevails in order to know what means or measures to be adopted to abate it; we must know the ratios of births to deaths in every part of the State, in city, town and in the rural district, to know whether we are keeping up the population according to the normal law of increase or retrogression. This can only be done by rigidly enforcing the statute. If we are to judge from the data at our hand, it would appear that the deaths are in excess of the births, and yet we know this is not true.

The subject of vaccination, which has engaged the attention of the Board of Health since its organization, has lost none of its interest, and the Board again reaffirms and reindorses the wisdom of its conclusions heretofore expressed, believing that of all sanitary measures this is the most striking illustration of what can be done by the use of the well-known and thoroughly tried prevention. It is one which the people at large understand, and the value of which is so patent as to be appreciated by many who do not recognize the importance of other means as preventive of some other diseases. The world's judgment holds to the protective power of vaccination against a disease which is not only widespread, but fatal, and we believe it should not be left to the discretion, whim, or choice of individual citizens, whether they will avail themselves of its protective power, but the

duty of the State to protect the innocent and helpless against the ignorant or indifferent.

The law-abiding citizen is protected by law against the incendiary and the murderer, while freedom is permitted the infectious and contagious patient to roam at large and scatter broadcast an element far more dangerous to society than either. During the prevalence of Small-Pox in the City of Wilmington, Del., from which disease alone there occurred 120 deaths, as reported by the Registrar, we are to learn of the paramount necessity of enforced general vaccination, and this Board fully coincides with our honored President when he says that "some means of preventing Small-Pox being introduced into our public schools should be taken," and they, therefore, by a resolution passed at their meeting held in Dover, December 12, 1882, respectfully suggest that the Legislature pass an amendment to our health laws, making it obligatory upon every child and teacher, on entering our public schools for the first time, to produce satisfactory evidence either of vaccination or of having had the Small-Pox; and we believe our Legislature would be endorsed and supported by the professional judgment of every physician in the State.

In health, the citizen or even whole communities are so indifferent and careless of any duty, or prospective danger, as to omit any means of protection against disease, and in consequence the State is being increased in an element of unprotected of all ages, who only await the sojourn of a case of Small-Pox among them, or the introduction of infected clothing, to overwhelm them with fear, and, too often, sweep away entire families. Under improved sanitary surroundings, the plagues which once devastated the earth, have nearly ceased to exist, and vital statistics establish the fact that the average duration of life has been prolonged. To public hygiene are we indebted then not for greater freedom from disease, but for lengthened life also. It has been left for this age to extend the knowledge of hygienic laws to the people, to so surround and indoctrinate them with wholesome sanitary laws that we may be said to have entered into a new era of medicine, "its highest and most beneficent development." People

are beginning to learn the grand fact that underlies "State Medicine," viz: that disease is in a great degree preventable. For this reason it is, that nearly every State in the Union has its "Health Board," and general sanitary associations. The effort of the physician is to cure disease when established, if possible, but how much greater the function of the sanitarian who seeks to prevent its inception, nay, stamp out the very causes which, once set in motion, have a potency and far-reaching effect, far beyond all human calculation. In this, his is a higher work, and one which gives greater promise of good to the world at large, dealing, as he does, more with communities than with individuals. Nor does his influence stop in the promotion of physical good to his fellow, for it must not be forgotten that the same means which promotes his physical, also promotes his moral and social status. Locations unhealthy, rooms overcrowded, foul-air, impure drinking water, neglect of personal and public cleanliness, insufficient appliances, intemperance, habits of impurity, these are not only factors of disease, but of moral debauchery and degradation also. To eradicate these fungi on the body politic is therefore to elevate man morally and intellectually, and to place him in the sphere designed by his Creator. We think it needless here to refer to the work accomplished by the different State Boards of Health since first organized in this country about fourteen years ago, first by Massachusetts, and subsequently by Michigan, which latter State has perhaps done more for sanitation than any other single State; nor to England and Prussia, which have derived incalculable benefit as conservators of the best physical interests and real blessings to their people. On other than grounds of humanity alone are we to estimate the wisdom of these organizations, for we believe that there is "nothing so costly as sickness," whether of the individual or of communities. That "public health is public wealth," is an aphorism, and anything which contributes thereto increases the happiness and the wealth of the State.

Perhaps it is not too much to affirm that the pecuniary loss to the State by preventable sickness, annually, is sufficient to defray all the necessary expenses incurred in its government were we to ignore

no higher motive or argument in favor of such organizations as health boards. If, by its investigations into the causes of disease, and timely notice and advice given, it shall save the life of but a single citizen, then should the State consider itself amply repaid for the cost of its health board, and humanity demand a liberal allowance for its sustentation. If the object of legislation be to "secure the greatest good to the greatest number," then may we not expect of our General Assembly abundant provision for carrying forward the sanitation of our State.

Not only should we look to the spread of contagious, infectious, and epidemic diseases, but domestic sanitation be encouraged through our local boards by a spontaneous compliance, instead of a reluctant yielding to plain hygienic laws.

#### DRAINAGE.

By an intelligent and skillfully planned system of drainage of our marshes, low-lands and swamps, thousands of acres of our most productive lands may be reclaimed that to-day remain more or less submerged and unproductive except of malarial fevers. The President of our State Board, in his paper on malaria, conclusively shows that by drainage, diseases of a zymotic origin have decreased in our State in proportion thereto. In his condensed report, he concludes that the proportion of cases of malaria to all other diseases in Kent and Sussex Counties is 37 per cent., and that it is now less than 35 per cent. than a few years ago; and this he attributes to drainage, better living, better sewerage, better drinking-water, and the use of lime as a fertilizer. If then it be "honorable to make two blades of grass grow where one grew before," how much more so by proper sanitation to prolong life by making it more healthful and enjoyable.

The subject of sewerage, while it is of vital importance to the denizens of Wilmington and our larger towns, and one which to-day confronts them, and must be met, it is not my purpose to discuss nor to offer any opinion, since these belong to the department of the engineer; but to call attention to their importance from the fact

that, from defects in this department, Diphtheria and Typhoid Fever are believed to have their origin and dissemination, and from these silent, hidden, subterranean guardians of the public health, we are to expect, if not immunity from disease. at least a decrease.

Whatever difference of opinion exists regarding the size and shape of sewers, and the manner of construction, all are unanimous in opinion that they should be of such material as will prevent the escape of the liquid portion of the sewage ; but more especially of that subtle, deadly poison—sewer gas—and that all waste pipes of the house are to be disconnected from the sewer outside, by means of chambers, tanks or traps, with ventilating pipes extending to the roof.

It is of the utmost importance that every householder should understand the danger to the health of his family from drinking-water, and to avoid the causes of contamination. Statistics have proven that surface water is one prolific cause of consumption and kindred diseases, yet how few examine the condition of the soil below the surface when locating their homes.

Country homes should be supplied with every facility for carrying off the waste water and effete matters of the household, and that beyond reach of harm to his neighbor, and, at the same time, so far removed from the well that it will be unlikely by percolation through the soil that it should be contaminated.

The location of barn-yards, stables, pig-stys and privies should have regard to the water-supply for drinking and culinary purposes.

It is a common practice, in the country, to have the well for watering cattle in the corner of the yard, whence is obtained all the drinking water for family use also. This is a most pernicious practice, and one not to be too severely condemned, for we are satisfied, from actual observation in many instances, that Typhoid Fever resulted directly from percolation through the soil of excrementitious matter of the animal.

The rainfall for the past year, over the country east of the Alleghanies, was the heaviest for the period since 1873. The consequence has been that the rivers and water-courses emptying into the Atlantic ocean were unusually charged with filth, sediment and sewage to an extraordinary extent, which doubtless contaminated the water supply of our seaboard cities and towns. Whether the epidemic of Diphtheria in Philadelphia, Jersey City, and some of the interior counties of Pennsylvania, is traceable to this cause or not, it is certain that a large number of diseases, formerly supposed to be due to some occult and unremovable cause, are due to the consumption of impure water. People forced to drink water from rivers known to have received dangerous polluting matters, are told by some scientists that the water is purified by irrigation and downward filtration through the soil during its flow, and the organic matter oxidized. However this may be, other investigators of water impurities say that, "living matter does not get oxidized by flowing down a stream any more than a fish." The ablest hygienists and experts declare that no means yet suggested will purify sewage-polluted water of the specific germs of disease. With these facts before us, constructed as our pumps and wells are, and they serving as receptacles of surface-drainage from kitchen-sewage, barnyards, and privies, it would seem doubtful whether we should use a well for any great length of time, in any town, with safety, because each well acts as a drain to an inverted cone of from ten to twenty feet in depth, and in wells along or near our tide-water courses, ebb and flow with the tide. To obviate and avoid this surface-pollution of our supply of drinking-water, driven-wells at a depth of from 40 to 80 feet, should be used. Actual demonstration permits me to say that, at a depth of 52 feet, we have a never-ceasing flow of water, and there is scarcely a doubt but that similar success would attend the driving of such wells anywhere on our Peninsula.

If we could but educate our people to the appreciation of the fact that a homestead should be built only on a soil thoroughly drained, and that without which there exists the certain abode of disease; that houses with their water supply, privies, cesspools, piggeries, and barn-

yards in close proximity, are but little less than death-producing abodes, our labor will have met its reward.

The following data, collected from the Recorders of the State of Delaware, and tabulated, are submitted in order to prove assertions heretofore made, viz: that the mortality and sick-rate of this State is larger than of necessity they need be, and that they may be abated if our people can be persuaded to use the necessary means to that end, and to show what can and should be done to accomplish the end desired, *i. e.* to reduce the average of sickness and premature decay and death to the lowest possible point for all classes and conditions of our population.

In a variety of ways this partial success is set forth in the accompanying papers, and in none more plainly than in the papers of Drs. L. P. Bush and Jno. K. Kane. These evidences will enable us to see how far off we are yet from the goal devoutly to be reached, viz: the attainment of all the benefits which obedience to the laws of health will secure to us, and what would appear evident we must do to reach the point of the lowest death-rate.

We are cognizant of some errors in this report on vital statistics—the first ever made to this State—but the method of collecting these data being left to the choice of them to whom we must look, we could do no better. Taken in this way, however, with all their faults, and with corrections, as familiarity with them enables the Secretary to make, they are of value. Let us hope hereafter that all whose duty it is under our law to report marriages, births, and deaths, will faithfully and promptly fulfill their several duties, so that from the quarterly reports of the Recorders valuable data may be had, from which we may learn of any prevailing epidemic, or the occurrence of any local or sectional disease.

Appended hereto will be found a correct statement of expenses since the organization of the Board of Health of the State of Delaware, April 28, 1879, to December 24, 1882, and the purposes therefor, viz:

Traveling expenses of the members of the Board .....	\$190.62
Printing, stationery, expressage and postage .....	42.25
Salary of the Secretary for $3\frac{1}{2}$ years, ending October 30, 1882 .....	350.00
	<hr/>
	\$582.87

All of which is respectfully submitted.

WM. MARSHALL,  
*Secretary Board of Health of Delaware.*

## PRESIDENT'S REPORT.

### *To the Members of the Delaware State Board of Health :*

GENTLEMEN : As this is the last meeting which the State Board of Health will hold before the next session of the Legislature, it is proper that I should make some statement of the present state of the Board, and some suggestions regarding the future. The Secretary will present the statistics as gathered from the Reports on Births, Marriages and Deaths.

I may premise that the Board is not furnished with funds by the State sufficient to enable it to have printed and disseminated through the State any papers on the subject of Public Hygiene, in a separate form, so that the people might be reached and information communicated on the various subjects embraced in that term. Some of these subjects are, vaccination, ventilation, purity of water, drainage, the effects of dampness, the prevention of contagious diseases, disinfection, and a number of other like subjects. At its last session, the Legislature ordered 300 copies of the report of the Board to be published, which were evidently quite insufficient for general distribution among the people. That report contained the address of the Board to the Legislature, the report of the Secretary, a paper compiled from statements of the physicians of the State upon the subject of Malaria, its causes and means of prevention, and a paper on the proper feeding of infants, all which may be presumed to be not only interesting, but instructive to our people.

At the last session of the Legislature, a bill was passed, agreeably to the request of the Board, for the Registration of Births, Marriages and Deaths. By the requirements of that law, the Recorders of Deeds of the State provided books of record, and sent circulars with blank forms for registration, to all physicians and other persons required by the law to make reports to the Recorders. I am informed

that the reports have not as yet been as full as is required by the law, which is unfortunate, to say the least, as the analysis of these returns by the Secretary cannot therefore exhibit the true state of the salubrity of the different sections of the State, or the proportion which exists between births and deaths, which is an important fact, as on this depends one evidence of the prosperity of the State; and besides, though there should be a return of a birth, without the name of the child upon the record it becomes valueless for legal purposes. I would therefore propose that the Board memorialize the Legislature to enact a law making it obligatory upon the Recorders, when the name of a new-born child has not been reported previously to the time for his quarterly report to the Secretary of the State Board, to send a circular to the family, requiring the parents or family in charge of such child, under the penalty of the law, to return, within forty-eight hours, the name of said child; and enclosing a postal card on which the name may be written and returned to the Recorder.

It has been suggested by the Secretary of the Board, that a memorial be addressed to the Legislature, asking for an increase of the appropriation for the necessary expenses of the Board, to the amount of \$400 per annum. This will enable the Board to print and make such a dissemination of the papers of the Board as will result in a good degree in impressing the minds of the people with the importance of the subject brought to their attention by the Board. No doubt many of such papers would be thrown aside; but there is a large class of our people who would receive the information contained in those papers, and apply it to the preservation of the health and lives of their families and neighborhoods. It must be evident to every one that unless such a system is provided, the influence of the Board upon the health of the people must fall very far short of the purposes contemplated in the establishment of the Board.

At the last session of Congress, that body refused to grant to the *National Board of Health* an appropriation sufficient to warrant the prosecution of the requirements of the original law. This is a matter of serious importance, and, no doubt, originated in a misunderstanding, or want of appreciation of the work which the Board has under-

taken. Besides the work of the Board in arresting the great epidemic of Yellow Fever in 1878, it had instituted a series of investigations into the causes of the various contagious diseases. These investigations were of the first importance to the people at large, and were such as could not be carried out, except by National or State aid. In view then, of the great benefits arising from the National Board of Health, it is deemed advisable that this Board should transmit to our representatives in Congress the view which it entertains of the purposes and work of the National Board of Health.

At the last meeting of this Board, Dr. Kane presented a paper on the subject of vaccination, which embodied briefly, in such language as is appropriate to a paper for the people, the main points relating to that subject, which was directed to be included in the report of the Secretary to the Governor of the State. It is a paper of so much importance that too wide a circulation cannot be afforded to it.

L. P. BUSH,

*President of the Delaware State Board of Health.*

## VACCINATION.

### OF THE IMPORTANCE OF GENERAL VACCINATION AND THE GROUNDLESSNESS OF THE PREJUDICES AGAINST IT.

So far as we can gather, Small-Pox was unknown to the ancient Greeks and Romans, and made its first appearance in Arabia, in the middle of the sixth century, about the birth-time of that other scourge of Christendom, Mahommed, by whose followers it was introduced into Europe.

Like all contagious diseases when first implanted on a virgin soil, its ravages were frightful. At one time it was rare to see a face not more or less disfigured by it. We have no statistics to enable us to determine the death-rate at that early period; but history would lead to the belief that a large majority of those who were exposed to contagion took the disease, nearly two-thirds of whom died, while recovery with total blindness was of common occurrence. There is a tradition in the East that the disease first originated in the camel, from which patient-drudge it was transmitted to man by contagion, much in the same manner as the original vaccine disease was conveyed to the milkmaids of Somersetshire. This, however, is extremely doubtful. It certainly is at variance with the rule that all diseases transmitted from the lower animals to man, such as glanders, hydrophobia, and vaccine, lose their power of infection and can only be transmitted by contagion. Indeed it is difficult to convey disease from the brutes to man, even by actual contact; vaccine and the equine-pox stand alone as happy exceptions.

Saco, of Lombardy, claimed to have protected human beings from Small-Pox by inoculating them with matter taken from the pustules of

sheep affected by Sheep-Pox; but the experiments of Dr. Marson, of London, and Mr. Ceeley, of Aylesbury, in England, during the prevalence of sheep-pox there in 1847, were most unsatisfactory, the only successful case of inoculation being one in which a lancet was used, which had previously been employed in vaccinating.

In 1718, Lady Mary Wortley Montague, on her return from Constantinople, introduced into England a practice much in vogue among the Turks, which consisted in inoculating a perfectly healthy person, in the best condition to resist disease, with matter taken from a Small-Pox pustule. This, like all innovations, was resisted at first, but soon became popular. Experience showed, however, that, though the inoculated individual usually, (not always) escaped with a comparatively light attack of the disorder, he became a centre of contagion to all around him. So that the death-rate from Small-Pox actually increased from the time of its introduction. The performance of inoculation was therefore prohibited by law in most European countries prior to the year 1831, Spain, I think, being the sole exception.

In 1768, Edward Jenner, a surgeon's apprentice at Sodbury, a small town on the border line between Somersetshire and Gloucestershire, the great cheese-making and dairy districts of England, had his attention drawn to the fact that the milkers, whose hands had become sore from milking cows affected by cow-pox, were commonly reputed to have an immunity from Small-Pox. He investigated the matter and found that the immunity really did exist. Then a bright thought flashed across the brain of the apothecary's boy—might he not, by artificial means, convey the cow-pox from the cow to man, and then from man to man, and so combat and foil the Small-Pox, that hideous enemy of our race? It was not, however, until the year 1798, after many years of patient observation, and carefully repeated experiments, that he ventured to publish to the world his great discovery, "that masterpiece of inductive reasoning," probably the greatest boon to man since Christianity.

Here it is as Jenner promulgated it: 1. Vaccine accidentally communicated to man protects him from Small-Pox. 2. That specific vaccine alone, and no other eruptive disease affecting the cow, has

this protective power. 3. That vaccine may be communicated at will by the hand of the surgeon from the cow to man, and thence from one human being to the other, without losing its protective power.

It is in the transmission from man to man that the great value of Jenner's discovery lies; and since his time, until a very recent period, a large majority of all vaccinations have been effected by this means. So that among adults, at least, the greater proportion of protected persons owe their immunity to lymph, which has been transmitted from one human being to another ever since Jenner first took it from the cow.

The cow-pox never originates in man, but is, as its name implies (vaccine, from *vacca*, a cow,) essentially a cow disease. Indeed its spontaneous origin is almost exclusively confined to milch cows, among whom it may occur either accidentally or as an epidemic.

With reference to the phenomena of the disease in the cow, let me quote literally from Dr. Seaton, from whose monograph, and that of Dr. Marson, the materials for this paper have been largely drawn. The vesicles are usually confined to the teats and udder. "It has a very precise and definite course. About four days from the probable period of invasion, with little or no apparent general indisposition, small tender papules appear near the udder and on the body of the teats. These become developed into vesicles, the most characteristic of which are seen to have an elevated margin, a central cup-like depression, and by the eighth or ninth day, generally, a pale rose or light damask areola, not more than a line or two about the base.

"In two or three days more the disease has reached its acme; the areola has extended to four or five lines, with circumscribed induration of adjacent skin and subjacent cellular tissue; the vesicles, if they have not already burst, are turgid with lymph, which, perfectly clear before, is now becoming opaque. By the twelfth day the lymph is more decidedly turbid, and a process of dessication and incrustation has begun, which in five or six days more is complete. The crusts so formed separate spontaneously, at from the twentieth to the twenty-

fourth day from invasion, leaving behind them permanent, slightly depressed cicatrices. From traction in the process of milking, the vesicles, when fully formed, very generally burst, and the lymph which exudes from them is generally found to produce sores of a definite and similar character on the hands of the milkers, who in their turn transfer the lymph to other animals in the dairy.

“The symptoms which cow-pox manifests in the human subject resemble very closely those already described as observed in the cow. If vaccine lymph be taken on the point of a lancet and inserted by puncture on the arm of an infant, who has not before been vaccinated, no particular local effect is noticeable for the first two days; but, if the vaccination be about to succeed, by the end of the second or by the third day, a slight papular elevation is perceptible, which, by the fifth or sixth day has become a distinct vesicle of a bluish-white color with a raised edge and a peculiar central cup-like depression. By the eighth day (the day week from the insertion of the lymph) this vesicle has attained its highest perfection, is plump, round and more decidedly pearl-colored; the elevation of its margin and the depression of its centre are more marked. At this date, or sometimes a few hours earlier, a ring of inflammation, termed the areola, begins to form about its base, and, for the next two days, continues to spread. It is circular, and, when fully developed, has a diameter of from one to three inches, and is often attended with considerable hardness and swelling of the subjacent connective tissue. The establishment of the areola demands especial attention, as it is the anatomical evidence that the cow-pox has produced its specific effect on the constitution.

“Other proofs of the constitutional influence of the vaccination are, at this period of its course, generally afforded in the child’s restlessness and heat of skin, with (frequently) derangement of the stomach and bowels, and the exhibition of vesicular and papular eruptions on various parts of the body with sometimes swelling of the axillary glands. But these general symptoms, though seldom altogether absent, are often exceedingly slight, nor, provided the areola be properly formed, are they to be looked upon as indispensable for the

protective effects of vaccination. After the tenth day the areola begins to fade, the vesicle begins to dry in the centre, the lymph remaining in it becomes opaque and concrete, and by the fourteenth or fifteenth day a hard, brown scab is formed, which contracts, dries, blackens, and, from the twentieth to the twenty-fifth day falls off, leaving a cicatrix commonly permanent, and which in character is circular, somewhat depressed, foraminated or indented with minute pits, and sometimes radiated.

“When lymph is employed that is derived directly, or very recently (as within three or four removes) from the cow, the course of the disease is generally retarded at various stages. Papulation is sometimes deferred until the seventh, eighth, ninth or even the tenth day, and the areola is not complete till from the eleventh to the fourteenth or even the sixteenth day. The areola, when at its height, is more indurated than is observed in vaccination with ordinary humanized lymph, and is said to decline or revive, continuing to exhibit a brick-red or purplish hue while the hardness remains. The papular and vesicular eruptions, which have been above referred to as occasionally attending the vaccination at this stage of its course, are more frequently seen. The vesicles themselves are commonly not more developed than those produced by ordinary lymph. Desiccation is generally prolonged, and the crust is often retained until the fourth or fifth week.”

Within a recent period a dread has spread throughout our community lest other constitutional evils, even more to be dreaded than Small-Pox itself, might be communicated with the vaccine taken from the human subject; and this has led to the establishment of farms for the raising of cattle expressly for the purpose of producing vaccine lymph direct from the heifer, in which quills or ivory points are dipped and distributed for sale in all our leading drug stores. I have tried these faithfully, and at first to my extreme satisfaction, the results being exactly what I had been lead to anticipate, but for the last two years I have ceased almost altogether to employ them.

I think that the demand for them has become so great that, either the vendors, not content with the very great profit that must have

accrued to them legitimately, have used a spurious imitation, (nothing could be easier than to stain a quill or ivory point with mucilage and cochineal), or else that the retailers sell stale points which have become inert. The points and quills, of which I speak, either give no result at all, or else, somewhere between the fifth and ninth day, a raspberry colored vesicle appears, not indented, and unaccompanied by either induration or areola. This gradually dries up and chips off in a thin bran-like scale, leaving little or no trace behind. Last month I was forced, in a case of emergency, to employ a quill warranted fresh by one of our leading druggists, and obtained just the result I have stated above. Two days after the scale had chipped off I revaccinated with lymph taken from a healthy child, and obtained perfect results.

Of late years, certain practitioners of medicine, chiefly Germans, and mostly of the homeopathic school, have endeavored to bring Jenner's great discovery into disrepute. Forgetting or ignoring the fact that Jenner claimed for vaccination only the same protective power that a previous attack of Small-Pox could give, they have ferreted out the cases of Small-Pox occurring after vaccination, and taking no count of the many cases of secondary Small-Pox which occur, boldly state that vaccination has no protective power. I have carefully examined the tabulated statistics of many European cities, as well as those of our own country, and feel able to state, with confidence, that of those who die from Small-Pox the average is only from\*  $3\frac{1}{2}$  to 4 per cent. in the vaccinated, as contrasted with 30 to 50 per cent. of those who were unprotected by vaccination.

The gravest objection to the employment of humanized lymph in vaccination, is the one of which I have already spoken as having caused a genuine dread of the operation throughout our community, and, were it well founded, might well give us pause before resorting to it, *i. e.* that other diseases to which human flesh is heir might be transmitted with the vaccine. Fortunately for humanity, however, experiment has shown that pure vaccine lymph cannot carry any other disease than itself. M. Trousseau, in one case, accidentally con-

\*See tables 1, 2, 3 and 4.

veyed vaccine lymph from a patient affected with constitutional syphilis to a healthy child, with no bad results. Later Messrs. Taupin and Cullerier ——— in France, and Dr. Heim in Germany, tried the experiment on a large scale, vaccinating numbers of healthy children with vaccine lymph taken from syphilitic sources, and in no instance did any evil effects result. Of course, if the crust is used, impure blood and pus may be mixed with the vaccine and evil follow, but pure lymph, drawn from a well-formed vaccine vesicle, seems to be capable of conveying vaccine only.

In England, vaccination is almost exclusively performed from arm to arm, the fresh lymph being drawn from one child and transmitted immediately to another, which can readily be done without causing pain by puncturing the vaccine with a pointed quill below the vesicle. In this country, however, vaccination is often performed in the rudest and most careless way, frequently by unprofessional persons, who are entirely incapable of judging either of the quality of the virus used, or of the efficacy of the results obtained ; if only a sore is produced they take it for granted that the vaccination has taken. Every apothecary in our leading cities has a stock of so called vaccine crusts, obtained when and where no one knows, which he will transmit by mail to any person who chooses to send fifty cents and a postage stamp. What wonder that the results are so often unsatisfactory? Jenner claimed that vaccine inoculation, when well, duly and efficiently performed, would give the same immunity from Small-Pox that a previous attack of the disease itself would give. He says, "I never expected it would do more, nor do I believe it will do less." He made clear what he meant by the terms, "well, duly and efficiently," by stating that at least four or five indented and radiated cicatrices should be left, and dwelt strongly on the fact that not only the quality, but the quantity of vaccine inoculated was an important factor in its protective agency. I have added to this paper some tables, which show how correct his views were in this respect.\*

It has become habitual in this country to be content with one small abrasion or incision, which often leaves but a slight trace behind it.

\*See table No. 4.

This has undoubtedly cost the loss of many valuable lives. It is strange that our medical schools should teach the minute details of capital operations which ordinary practitioners are seldom or never called upon to perform, and yet so often neglect to teach the proper methods of vaccination, as though the results of the operation were as trifling as the pain it causes.

The limits of my paper do not allow me to go so fully into details as I could wish on the subject of proper vaccination. I can only say that, to be certainly effective, several inoculations should be made, and that we cannot be too particular in selecting our lymph, which should always be fresh, and taken from healthy children with well-formed vesicles. Another point of importance is this: never vaccinate a teething child, or one having any cutaneous eruption, or who has any affection of the bowels or lungs, unless it has been subjected to unusual risk. A healthy child may be safely vaccinated after it is six weeks old; but unless it has been in actual contact with Small-Pox, so as to make the risk very great, it should not be attempted at an earlier period. After the sixth week we cannot vaccinate a healthy child too early, as it is desirable to avoid the teething period, and statistics show that in England, more than one-fourth of all the deaths from Small-Pox occur in children under one year of age.\* The protecting power of vaccination over those who have been exposed to Small-Pox contagion, depends solely upon the period at which the operation is performed. The eruption of Small-Pox does not appear until the fourteenth day after exposure or inoculation, while the vaccine vesicle makes its appearance on the third or fourth day after the lymph has been inserted. If vaccination is done sufficiently early, it will out-run the Small-Pox and exert its protecting power; but it becomes valueless if performed so late that the Small-Pox eruption appears on the skin before it has time to mature. Hence the great importance of immediately vaccinating all exposed persons, as a single day's delay may cost a life.

I cannot go fully into the subject of spurious vaccination, suffice it to say that it is usually characterized by greater pain and swelling

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\*See tables No. 5 and No. 6.

than a genuine vaccination, and always runs an irregular course, its manifestations being either premature or retarded.

The subject of re-vaccination is one upon which opinions vary. The commonly received one being in accordance with old superstition regarding the changes in our bodies, that the operation should be repeated once every seven years. However this may be, a sore arm is the worst result to be apprehended, which is certainly a small disaster compared with an attack of Small-Pox.\*

I have waded through a great mass of rubbish written by the opponents of vaccination, in my honest endeavor to reach the truth for the benefit of our own community. I have arrived at the following conclusions: First—Vaccination reduces the number of those who take the Small-Pox, after having been exposed to it, to the same extent that a previous attack of Small-Pox does. Second—That in those exposed who do take the disease, it is usually modified in form, greatly less dangerous to life, and much less likely to produce disfigurement or bad after-results. Third—That when properly performed with well-selected lymph, there is no danger of scrofula, syphilis, or any other constitutional disease being transmitted with the vaccine.

I have, therefore, no hesitation in expressing my opinion that vaccination should be made compulsory, or, at least, that no child should be admitted into our public schools without evidence either of having been properly vaccinated, or else having gone through an attack of Small-Pox.

\*See table No. 7.

TABLE NO. I.

Showing relative mortality from Small-Pox before and after the introduction of Vaccination.

PERIODS COMPARED.	Annual deaths by Small Pox in England and Wales.	Annual rate per million of the population.
1. Average of thirty years previous to introduction of Vaccination, estimated by Dr. Lettsom and Sir Gilbert Blane . . . . .	. . . .	3,000
2. Average of three years (1838-40) when Vaccination had become to a great extent diffused, but before any public provision was made for its gratuitous performance . . . . .	11,944	770
3. Average of nine of the years (1841-53) when public Vaccination was gratuitously provided, but Vaccination was not obligatory . . . . .	5,221	304
4. Average of the twelve years, (1854-65) during which Vaccination has been to a certain extent obligatory . . . . .	3,967	202

TABLE NO. II.

CLASSIFICATION OF PATIENTS AFFECTED WITH SMALL-POX. SMALL-POX HOSPITAL OF LONDON.	Number of deaths. Per cent. in each class respectively.
1. Unvaccinated . . . . .	35
2. Stated to have been vaccinated, but having no cicatrix . . . . .	23.57
3. Vaccinated—	
a. Having one vaccine cicatrix . . . . .	7.73
b. Having two vaccine cicatrices . . . . .	4.70
c. Having three vaccine cicatrices . . . . .	1.95
d. Having four or more vaccine cicatrices . . . . .	0.55
a. Having well-marked cicatrices . . . . .	2.52
b. Having badly-marked cicatrices . . . . .	8.82
4. Having previously had Small-Pox . . . . .	19

This table conclusively shows that vaccination exercises, at least, as much protective power as a previous attack of Small-Pox.

TABLE NO. III.

Observations made by Drs. Buchanan and Marson, of fifty thousand public school children in London, during the epidemic of Small-Pox in 1863, showing the value of both quality and quantity of vaccine inserted.

CLASSIFICATION OF CHILDREN EXAMINED.	Proportion marked with Small-Pox per 1000 children in each class respectively.
1. Having no vaccine marks . . . . .	360
2. Vaccinated—	
<i>a.</i> Having one vaccine cicatrix . . . . .	6.80
<i>b.</i> Having two vaccine cicatrices . . . . .	2.49
<i>c.</i> Having three vaccine cicatrices . . . . .	1.42
<i>d.</i> Having four or more vaccine cicatrices . . . . .	0.67
<i>a.</i> Having cicatrix or cicatrices of bad quality . . . . .	7.60
<i>b.</i> Having cicatrix or cicatrices of tolerable quality . . . . .	2.35
<i>c.</i> Having cicatrix or cicatrices of excellent quality . . . . .	1.22

TABLE NO. IV.

Showing the rate per cent. of mortality from different forms of eruption in 2,654 unvaccinated cases of Small-Pox admitted into the Small-Pox and Vaccination Hospital, London, from 1836 to 1851, inclusive.

UNVACCINATED SMALL-POX.	Cases.	Deaths.	Rate per cent. of mortality.
Confluent . . . . .	1,838	937	50
Semi-confluent . . . . .	614	51	8
Distinct . . . . .	202	8	4
	2,654	996	37

NOTE—Eighty-one of the above patients who died were afflicted with antecedent or superadded disease, as well as with Small-Pox, viz: Confluent, 58; semi-confluent, 15; distinct, 8.

TABLE NO. V.

Analysis of all the cases of Small-Pox after vaccination admitted at the Small-Pox and Vaccination Hospital, London, for a period of 20 years, viz: From 1836 to 1855, inclusive, showing from a careful examination of the cicatrices the relative amount of security given by the number of vesicles produced at vaccination; and judging from the character of the cicatrices the probable state of activity and efficacy of the lymph used for Vaccination.

PATIENTS ADMITTED WITH SMALL-POX.	Number of patients.	Character of cicatrices.	Cases.	RESULTS.			
				Discharged.	Died.	Died affected by superadded disease.	Rate per cent. of mortality from Small-Pox after deducting cases affected by superadded disease.
1. Having one vaccine cicatrix .	2001	good indifferent	1032 969	978 835	54 134	15 21	3.83 11.91
2. Having two vaccine cicatrices	1446	good indifferent	873 573	841 516	32 57	12 10	2.32 8.34
3. Having three vaccine cicatrices . . . . .	518	good indifferent	307 211	300 202	7 9	4 2	0.90 3.34
4. Having four or more vaccine cicatrices	544	good indifferent	357 186	356 183	2 3	0 2	0.55 0.54
5. Stated to have been vaccinated, but having no cicatrix	370		370	269	101	18	23.57
6. Stated to have been vaccinated, but particulars of cicatrix not recorded . . . .	17		17	14	3	2	6.66
	4896		4896	4494	402	86	6.56

TABLE NO. VI.

Showing ages of the unvaccinated patients admitted with Small-Pox at the Small-Pox and Vaccination Hospital, London, from 1836 to 1851, inclusive, with the rate per cent. of mortality calculated at different periods of life.

DATE.	AGE IN YEARS.												
1836 TO 1851.	0-5	5-10	10-15	15-20	20-25	25-30	30-40	40-50	50-60	60-70	70-80	80-90	Total.
Patients . . . .	356	334	270	571	669	270	154	18	8	2	1	1	2,654
Deaths . . . .	181	91	62	154	274	124	89	13	5	1	1	1	996
Percentage of deaths . . . .	50	27	23	26	40	45	57	69			75		37

TABLE NO. VII.

Deaths in England from Small-Pox at different ages, for nine years, (1855-63).

All ages.	Under 1 year.	1-2 years.	2-3 years.	3-4 years.	4-5 years.	Under 5 years.	5-10 years.	10-15 years.	15-25 years.	25-35 years.	35 yrs. and upwards.
30,707	7,334	3,370	2,666	2,152	1,732	17,254	4,078	1,169	3,552	2,422	2,232

TABLE NO. VIII.

The following table, showing the results of vaccination in each 1,000 individuals revaccinated in the Würtemberg army in 1831-1835, and in English army in 1861, will give some indication of the local results that may be expected from the performance of revaccination in adults.

Persons in whom the revaccinations were performed.	Degree of success of re-vaccination.	In those who bore marks of previous Small-Pox.	In those who bore good marks of previous vaccination.	In those who bore doubtful or imperfect marks of previous vaccination.	In those who bore no marks of previous vaccination or small-pox.
Würtemberg army 1831-1835, (13,861 cases.)	Perfect	319.5	310.4	280.7	337.3
	Modified	248.1	280.5	259	191.1
	None	432.3	409.2	460.4	471.6
		1,000	1,000	1,000	1,000
Soldiers in British army not recruits in 1861, (2,053 cases.)	Perfect	451.4	484.6	236.8	326
	Modified	159.6	157.4	505.3	277.5
	None	389.0	358.0	257.9	396.5
		1,000	1,000	1,000	1,000
Recruits in British army in 1861, (4,395 cases.)	Perfect	345.5	407.3	461.3	527.3
	Modified	266.8	240.8	301.3	202.6
	None	387.7	351.9	237.4	270.1
		1,000	1,000	1,000	1,000



**STATISTICAL TABLES**  
**ACCOMPANYING REPORT OF THE STATE**  
**BOARD OF HEALTH.**



TABLE NO. I.  
A statement of the Deaths, Births, Marriages and Divorces for one year, ending June 30th, 1882.

COUNTY.	DEATHS.				BIRTHS.				MARRIAGES.										
	Native.		Foreign.		Births.		Sex.		White.		Colored.		Native.		Foreign.				
	W.	C.	W.	C.	Total.	W.	C.	M.	F.	M.	F.	M.	F.	M.	F.	Total.			
New Castle.	1164	364	193	2	1723	1403	140	825	718	1543	240	240	71	71	276	283	35	28	311
Kent . . . . .	137	24	2	163	245	25	122	148	270	139	139	24	24	159	163	4	4	163	
Sussex . . . . .	48	3	1	52	114	5	53	66	119	130	19	19	19	19	147	149	2	2	149
	1349	391	196	2	1938	1762	170	1000	932	1932	509	509	114	114	582	595	41	28	623

TABLE NO. I.—CONTINUED.

Of the above the following are the numbers of those previously married, and the number of times married, and of those divorced.

COUNTY.	1.		2.		3.		4.		5.		6.		7.		Not stated.		Divorces.	
	M.		F.		M.		F.		M.		F.		M.		F.		M.	
	Total.		Total.		Total.		Total.		Total.		Total.		Total.		Total.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
New Castle . . . .	246	265	44	25	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Kent . . . . .	148	160	11	3	4	4	1	1	1	1	1	1	1	1	1	1	1	1
Sussex . . . . .	118	132	23	9	1	1	2	1	1	1	1	1	1	1	1	1	1	1
	512	557	78	37	6	6	2	2	1	1	1	1	1	1	1	1	1	1

TABLE NO. II.—MARRIAGES.

Reported Marriages for a period of thirteen weeks ending October 1, 1881.

COUNTY.	COLOR.						NATIVITY.						CONDITION.						Divorced					
	White.			Colored.			Native.		Foreign.				Not stated.		First Marriage		Second Marriage			Third Marriage		Fourth Marriage		Not stated.
	M.		F.	M.		F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.	M.	F.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.	M.	F.	
New Castle	52	30	22	22	49	51	3	1					40	41	6	5						6	6	
Kent	27	23	4	4	27	27							24	27	3									
Sussex	18	18			18	18							12	13	3	1						3	4	
	97																							

TABLE NO. II.—CONTINUED.

Reported Marriages for a period of thirteen weeks ending December 31, 1881.

COUNTY.	COLOR.						NATIVITY.						CONDITION.										Divorced		
	White.			Colored.			Native.		Foreign.				Not stated.		First Marriage		Second Marriage		Third Marriage		Fourth Marriage			N	
	M.		F.	M.		F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.
	M.		F.	M.		F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.
New Castle	103	86	17	17	89	95	14	8					89	98	14	5									
Kent	60	52	8	8	60	60							57	60	2									2	
Sussex	39	38	1	1	38	39			1				34	36	5	3									
	202																								

TABLE NO. II.—CONTINUED.  
Reported Marriages for a period of thirteen weeks ending March 31, 1882.

COUNTY.	COLOR.						NATIVITY.						CONDITION.													
	White.			Colored.			Native.			Foreign.			Not stated.		First Marriage		Second Marriage		Third Marriage		Fourth Marriage		Not stated.		Divorced	
	M.	F.		M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
New Castle	78	59		19	72		69	6	9				60	13	7	1	1					10	10			
Kent	51	42		9	49		51	2					54	43	2	3										
Sussex	41	33		8	40		41	1					31	34	6	3	1	1	1							
	170																									

NOTE.—From Sussex County, for quarter ending March 31, 1882, there were reported 1 male and 1 female who had been married the fifth time; 1 male and 1 female who had been married the sixth time; and 1 male and 1 female who had been married the seventh time.

TABLE NO. II.—CONTINUED.  
Reported Marriages for a period of thirteen weeks ending June 1, 1882.

COUNTY.	COLOR.						NATIVITY.						CONDITION.															
	White.			Colored.			Native.			Foreign.			Not stated.		First Marriage		Second Marriage		Third Marriage		Fourth Marriage		Not stated.		Divorced			
	M.	F.		M.	F.		M.	F.		M.	F.		M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
New Castle	78	65		13	66		68	12	10				63	11	8													
Kent	25	22		3	23		25	2					24	24	1													
Sussex	51	41		10	51		53						41	49	9	2												
	154																											

TABLE NO. III.—BIRTHS.  
Report of Births ending October 1st, 1881, a period of thirteen weeks.

COUNTY.	Total.	COLOR.				SEX.				NATIVITY OF PARENTS.				TWIN.				STILL-BORN.			
		White.		Colored.		Male.		Female.		Native.		Foreign.		White.		Colored.		Male.		Female.	
		336		30		104		172		270		96		6		1		4		6	
		8		17		33		48		2		8		1		1		1		1	
New Castle . . . . .	366																				
Kent . . . . .	50																				
Sussex . . . . .	8																				
	424																				

TABLE NO. III.—CONTINUED.  
Report of Births for a period of thirteen weeks ending December 31st, 1881.

COUNTY.	Total.	COLOR.				SEX.				NATIVITY OF PARENTS.				TWIN.				STILL-BORN.			
		White.		Colored.		Male.		Female.		Native.		Foreign.		White.		Colored.		Male.		Female.	
		365		30		211		184		105		90		11		1		11		7	
		33		1		16		18		33		1		2		1		2		1	
New Castle . . . . .	395																				
Kent . . . . .	77																				
Sussex . . . . .	34																				
	506																				

TABLE NO. III.—CONTINUED.  
Report of Births for a period of thirteen weeks ending March 31st, 1882.

COUNTY.	COLOR.			SEX.			NATIVITY OF PARENTS.			TWIN.			STILL-BORN.			WHITE. COLORED. COLORED.		
	Total.			Total.			Total.			Total.			Total.			Total.		
	White.	Colored.	Male.	Female.	Native.	Foreign.	Native.	Foreign.	Native.	White.	Colored.	Male.	Female.	Male.	Female.	Male.	Female.	Male.
New Castle . . . . .	334	46	209	171	305	75	321	59	10	8	2	10	8	2	10	8	2	10
Kent . . . . .	43	8	22	21	5	5	5	5	3	1	1	3	1	1	3	1	1	3
Sussex . . . . .	38	2	16	22	38	3	38	3	2	2	2	2	2	2	2	2	2	2
Total . . . . .	461																	

TABLE NO. III.—CONTINUED.  
Report of Births for a period of thirteen weeks ending June 30th, 1882.

COUNTY.	COLOR.			SEX.			NATIVITY OF PARENTS.			TWIN.			STILL-BORN.			WHITE. COLORED. COLORED.		
	Total.			Total.			Total.			Total.			Total.			Total.		
	White.	Colored.	Male.	Female.	Native.	Foreign.	Native.	Foreign.	Native.	White.	Colored.	Male.	Female.	Male.	Female.	Male.	Female.	Male.
New Castle . . . . .	402	34	211	191	305	97	323	79	1	1	5	2	1	1	1	21	13	13
Kent . . . . .	100	10	47	53	94	6	97	3	3	3	3	3	3	3	3	5	5	5
Sussex . . . . .	39	2	19	20	39	3	39	3	3	3	3	3	3	3	3	1	1	1
Total . . . . .	541																	









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